Lightweight CNT Shielded Cables for Space Applications, Phase II

Completed Technology Project (2017 - 2019)

Project Introduction

The effects of electromagnetic interactions in electrical systems are of growing concern due to the increasing susceptibility of system components to electromagnetic interference (EMI), use of automated electronic systems, and pollution of the electromagnetic environment with electromagnetic emissions. The effects of EMI can be detrimental to electronic systems utilized in space missions; even small EMI issues can lead to total mission failure, resulting in significant mission delays and economic loss. Additionally, NASA is challenged to find ways of effectively shielding sensitive electronic equipment from EMI without adding significant weight to space flight vehicles and satellites in order to manage fuel costs. The solution for both issues resides in the use of carbon nanotubes (CNTs), which offer the most promising solution for reducing spacecraft wire weight. CNTs are an alluring alternative to conventional conductors used in coaxial data cables because they combine mechanical strength, electrical conductivity, and low density. DexMat has developed a novel CNT deposition process for directly applying CNTs onto dielectric materials to produce an electrically conductive EMI shield. By placing a premium on the quality of raw CNTs, DexMat has created a product with increased potential to reduce cable weight while minimizing insertion losses when incorporated into wire. In the proposed research, DexMat seeks to develop a small-scale CNT Tape production process and continue the development of the CNT separation processes. The need for CNT Tape was discovered while obtaining feedback from potential customers that noted the desire for a product format that allows for quick and easy integration into existing manufacturing processes without the need for outsourcing processes.

Primary U.S. Work Locations and Key Partners

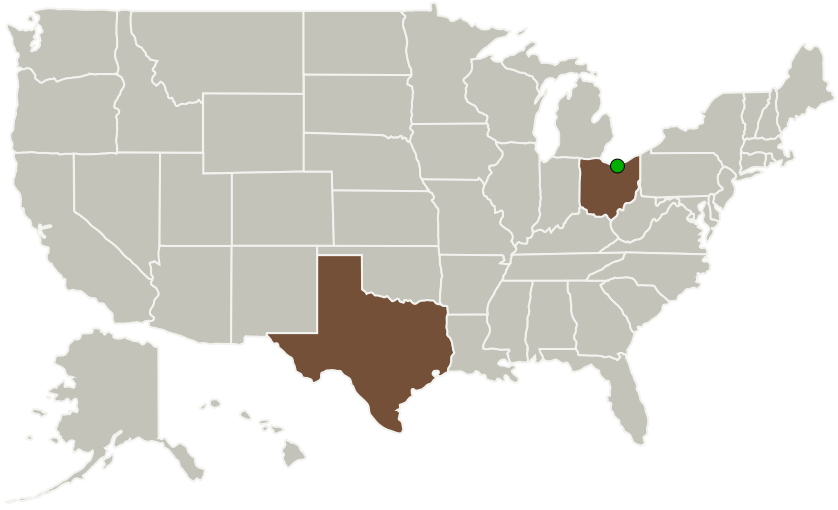

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Table of Contents

Small Business Innovation Research/Small Business Tech Transfer

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Organizations Performing Work	Role	Type	Location
Dexmat, Inc.	Lead Organization	Industry	Houston, Texas
Glenn Research Center(GRC)	Supporting Organization	NASA Center	Cleveland, Ohio

Primary U.S. Work Locations	
Ohio	Texas

Project Transitions

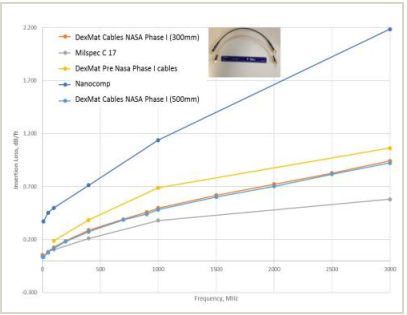
May 2017: Project Start

May 2019: Closed out

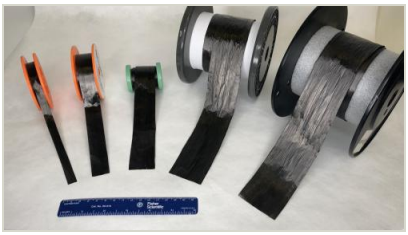
Closeout Documentation:

- Final Summary Chart*(https://techport.nasa.gov/file/140855)*

Images



Briefing Chart Image
Lightweight CNT Shielded Cables for Space Applications, Phase II Briefing Chart Image *(https://techport.nasa.gov/image/131159)*



Final Summary Chart Image
Lightweight CNT Shielded Cables for Space Applications, Phase II *(https://techport.nasa.gov/image/133612)*

Organizational Responsibility

Responsible Mission Directorate:
Space Technology Mission Directorate (STMD)

Lead Organization:
Dexmat, Inc.

Responsible Program:
Small Business Innovation Research/Small Business Tech Transfer

Project Management

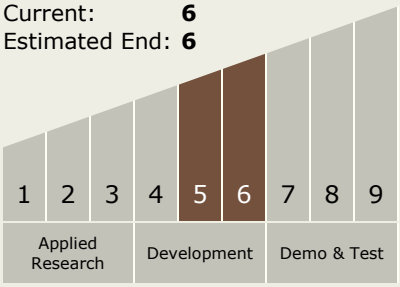
Program Director:
Jason L Kessler

Program Manager:
Carlos Torrez

Principal Investigator:
Alberto Goenaga

Technology Maturity (TRL)

Start: **5**
Current: **6**
Estimated End: **6**



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Technology Areas

Primary:

- TX03 Aerospace Power and Energy Storage
  - TX03.3 Power Management and Distribution
    - TX03.3.2 Distribution and Transmission

Target Destinations

The Sun, Earth, The Moon, Mars, Others Inside the Solar System, Outside the Solar System